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**CORRESPONSALES ESPECIALIZADOS
EN TODOS LOS PAISES DEL MUNDO**

JU/HA/JN/yo

Madrid, 9th April 2001

By fax and registered airmail:

00 49 89 2399 4465

Total number of pages:

4+2= 6

Re.: International Patent Application No.: PCT/ES00/00033
Priority: Spanish Utility Model U 9900280 filed 3rd
February 1999.
Title: EQUIPMENT FOR PURIFYING RESIDUAL
WATERS FROM HORTICULTURE AND
POMOLOGY CENTERS AND IN SITU
PHYTOSANITARY TREATMENT
Applicants: TECNIDEX, TÉCNICAS DE DESINFECCIÓN,
S.A.
O/Ref.: 100.015/MAD

Dear Sirs:

(1) In response to the first Written Opinion issued on the above referenced application in which original independent claim 1 of the present application was objected for lacking of inventive step over the disclosures of document D1 (EP-A-0176912), the following is submitted on behalf of the applicant.

Enclosed herewith is an amended claim 1 defining

a purification system for wastewater from fruit- and vegetable-processing plants and from phytosanitary treatments, the system comprising

a filter tank (1,15) where a pretreatment step is carried out;

a tank (6,7) for collecting clarified water resulting from the pretreatment step, said tank (6,7) comprising a stirrer (3) for uniformly mixing the clarified water;

pumping means (11) for pumping mixed clarified water from said tank (6,7) to a first active carbon column (9) of an array of active carbon columns (9) being prepared for purifying the mixed clarified water by adsorption up to established threshold values;

said first active carbon column (9) being connected by an outlet to an inlet of a subsequent active carbon column (9), each further subsequent active carbon column (9) being connected by its inlet to the outlet of the preceding active carbon column (9); and





automatic control means for providing that mixed clarified water is retained in each carbon column (9) for at least two hours.

As readily apparent, amended claim 1 differs from original claim 1, in addition to some linguistic amendments, in that amended claim 1 now includes a reference to

- * pumping means (11) for pumping mixed clarified water from said tank (6,7) to a first active carbon column (9) of an array of active carbon columns (9), this feature being supported in the original drawings and in the corresponding portions of the original description;

- * first active carbon column (9) being connected by an outlet to an inlet of a subsequent active carbon column (9), each further subsequent active carbon column (9) being connected by its inlet to the outlet of the preceding active carbon column (9), this feature also being supported in the original drawings and in the corresponding portions of the original description;

and, more importantly, to

- * automatic control means for providing that mixed clarified water is retained in each carbon column (9) for at least two hours, this feature being supported in lines 5-15 of the English text filed when requesting International Preliminary Examination of the present application.

It is first of all submitted first that D1 does neither anticipate nor suggest any of these features, so that the subject matter of amended claim 1 should be *per se* considered novel, unobvious and thus patentable.

Further, amended claim 1 is also considered to define subject matter which is inventive over the invention described in D1 because it significantly improves the efficiency of the process described in D1, in view of the following facts:

- Pretreatment step of purification:

The process mentioned in D1 requires to prepare the wastewater by adding powdered activated carbon, while the purification process disclosed in the present application does **not** use activated carbon in this stage of preparation; even does not require the use of **powdered** activated carbon in any stage.

Instead (as stated in claim 1), the process disclosed in the present application makes use of a different technique, comprising a filtration being accomplished in filter-tank (6,7).

- Second step of purification:

The process mentioned in document D1 makes use of just one active carbon tower, where the pre-processed wastewater is **sprayed** and air under pressure circulating from top to bottom is injected in order to allow the liquid phase to drip through the active coal ("und durch die A-Kohle hindurchrieselt ..." - e.g. page 13, lines 8-13) whereby





purification takes place in a continuous flow mode i.e. by the liquid phase is driven through the active carbon column.

Contrarily, the system of amended claim 1 of the present application uses a different technique according to which the system being provided with automatic control means by which the liquid phase is retained within each column for at least two hours i.e. the second step is carried out in each column in a static bed of activated carbon in a "batch" mode i.e. the liquid phase is allowed to rest in each of the active carbon columns for.

- As a result of the different techniques employed in each of the respective steps of the inventions respectively described in D1 and in the present application, according to test results obtained by the applicant, the percentage of purification degree obtained at the output of both stages is quite different:

	Oxygen Chemical Demand Reduction	
	STAGE-1	STAGE-2
Present Application	20%	85%
Document D1	52%	70%
	(1389 remaining out of 2880)	(403 remaining out of 1389)

These figures clearly show that the fundamental stage of purification in the present application is the second stage, while the first stage of the invention mentioned in D1 is much more **critical** since it nearly has the same importance as the second one. Such figures are different in such degree, due to the fact that the techniques employed in both inventions are quite different, as explained previously.

Moreover, also accordance with test data obtained by the applicant, the purification degree reached when using the invention described in D1, is 0.1ppm, while the system disclosed in the present application permits to reach a purification degree of 0.01ppm (ten times better).

Another important difference related to the number of columns comprising the array is the degree of contamination admissible for the operation of each system: while the process mentioned in D1 can purify wastewater with an Oxygen Chemical Demand comprised between 200 and 5000, the process disclosed in the present application has proven to be suitable to purify wastewater with an Oxygen Chemical Demand comprised between 200 and **16800**. This large difference is also due to the fact that the techniques employed in both inventions differ significantly.

In view of the above, it is submitted that the aforementioned differences and the great improvements in the efficiency achieved as a result of the features by which the present invention differs from the system disclosed in D1, are important enough to consider that they are not obvious for a person skilled in the art. In view thereof, it is submitted that the invention claimed is novel, unobvious and unexpectedly advantageous, and thus patentable over D1.





(2) Favourable consideration of the present submission is earnestly solicited. Should the examiner have further objections made, issuance of a corresponding second Written Opinion is requested. In view of the fact that the term until the IPER must be established will not expire until the 3rd June 2001, sufficient time for issuance of such a second Written Opinion and for eventually allowing the applicant to file a response thereto, should be available.

Respectfully submitted,

Javier UNGRIA

CLAIMS

1. A purification system for wastewater from fruit- and vegetable-processing plants and from phytosanitary treatments, the system comprising

5 a filter tank (1,15) where a pretreatment step is carried out;

a tank (6,7) for collecting clarified water resulting from the pretreatment step, said tank (6,7) comprising a stirrer (3) for uniformly mixing the
10 clarified water;

pumping means (11) for pumping mixed clarified water from said tank (6,7) to a first active carbon column (9) of an array of active carbon columns (9) being prepared for purifying the mixed clarified water by adsorption up
15 to established threshold values;

said first active carbon column (9) being connected by an outlet to an inlet of a subsequent active carbon column (9), each further subsequent active carbon column (9) being connected by its inlet to the outlet of the
20 preceding active carbon column (9); and

automatic control means for providing that mixed clarified water is retained in each carbon column (9) for at least two hours.

25 2. A purification equipment according to claim 1, characterised in that the tank-filter (1) is a settling tank with at least two outlets for the clarified water, to which flocculent can be added, the sludge being extracted by gravity through the lower part thereof and
30 sent to a filtering bag (5) where it is retained, while the clarified water is sent to an intermediate tank (7), being joined to this the water which passes through said filtering bag (5) and is received in a collection tank (6).



3. A purification equipment according to claim 2, characterised in that the filtering bag (5) is arranged inside a metal frame (4) which acts as a support for it and as a collector for the water passing through it on its way to the reception tank (6).

4. A purification equipment according to claim 1, characterised in that the tank-filter (15) is a polypropylene bag filter that includes diatomaceous earth, with circulation being maintained in closed circuit from the tank (6) containing water, the bags being filled with a pre-layer of this earth; a pump (11a) sucking the liquid to be purified and which passes through that filter (15) to the reception tank (6), from where it is decanted to the array of columns 9 of activated carbon.

5. A purification equipment according to any of the preceding claims, characterised in that at the outlet from the array of columns 9 of activated carbon is included an ultraviolet lamp (13) for optimising the purification.

6. A purification equipment for wastewater coming from fruit and vegetable processing plants and phytosanitary treatments in the field, according to any of the above claims, characterised in that the array of columns 9 of activated carbon, three in number, are mounted on a rotating plate (17) where there exists a fourth bottle (9) in reserve, which replaces number three when the first one becomes clogged up and is withdrawn and replaced by the second, with the third taking over in the second place.

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P ENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
United States Patent and Trademark
Office
Box PCT
Washington, D.C. 20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 19 October 2000 (19.10.00)	
International application No. PCT/ES00/00033	Applicant's or agent's file reference 100.015-VAL
International filing date (day/month/year) 03 February 2000 (03.02.00)	Priority date (day/month/year) 03 February 1999 (03.02.99)
Applicant GARCÍA PORTILLO, Manuel et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
22 August 2000 (22.08.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

<p>The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No.: (41-22) 740.14.35</p>	<p>Authorized officer</p> <p>Olivia TEFY</p> <p>Telephone No.: (41-22) 338.83.38</p>
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PATENT COOPERATION TREATY

From the:
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

16-01/70 / R2/CS

To:

UNGRIA LOPEZ, Javier
Avenida Ram n y Cajal, 78
E-28043 Madrid
ESPAGNE

PCT

(Commence se establie)

WRITTEN OPINION

(PCT Rule 66)

Date of mailing (day/month/year) 09.01.2001	
Applicant's or agent's file reference 100 015-VAL	REPLY DUE within 3 month(s) from the above date of mailing
International application No. PCT/ES00/00033	International filing date (day/month/year) 03/02/2000
Priority date (day/month/year) 03/02/1999	
International Patent Classification (IPC) or both national classification and IPC C02F9/08	
Applicant TECNIDEX, TÉCNICAS DE DESINFECCI N,S.A. et al.	

1. This written opinion is the **first** drawn up by this International Preliminary Examining Authority.

2. This opinion contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain document cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

3. The applicant is hereby **invited to reply** to this opinion.

When? See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also: For an additional opportunity to submit amendments, see Rule 66.4.
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 bis.
For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.

4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 03/06/2001.

Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer / Examiner Thomasson, P Formalities officer (incl. extension of time limits) Michaleczek, N Telephone No. +49 89 2399 7254
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I. Basis of the opinion

1. This opinion has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed".*):

Description, pages:

1-12 as originally filed

Claims, No.:

1-6 as originally filed

Drawings, sheets:

1/4-4/4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: english , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☒ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:



WRITTEN OPINION

International application No. PCT/ES00/00033

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:
see separate sheet

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement
- | | |
|-------------------------------|------------|
| Novelty (N) | Claims |
| Inventive step (IS) | Claims 1-6 |
| Industrial applicability (IA) | Claims |

2. Citations and explanations
see separate sheet

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Claim 1 does not meet the requirement of Article 33(3) PCT for the following reasons:

- 1.1 Closest prior art.

D1 (EP-A-0 176 912), considered as being the closest prior art, discloses an apparatus for purifying wastewater which comprises a tank associated to a filter, a collecting tank and adsorption tower containing activated carbon (see D1: claim 1 and figure 1: (1), (3), (4) and (7)).

- 1.2 Novelty.

The subject-matter of claim 1 differs from D1 in that the collection tank possesses a **stirrer** and in that it indicates an **array** of columns of activated carbon.

- 1.3 Inventive step.

The technical problem to be solved against D1 is to improve the purification of the waste water. The attention of the applicant is drawn to the fact that the presence of the stirrer and of the array is considered as being a slight constructional change which comes within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can readily be foreseen. Consequently, the subject-matter of claim 1 lacks an inventive step.

2. The technical features of claims 2-6 are either known from D1 or are considered to be merely one of several possibilities which the skilled person would select, in accordance with the circumstances, without the exercise of inventive skill. Consequently these claims also do not meet the requirement of Article 33(3) PCT.
3. It is not at present apparent which part of the application could serve as a basis for a new, allowable claim. Should the applicant nevertheless regard some particular



matter as meeting the requirement of Article 33(3) PCT an independent claim **including such matter** should be filed taking account of Rule 6.3 PCT.

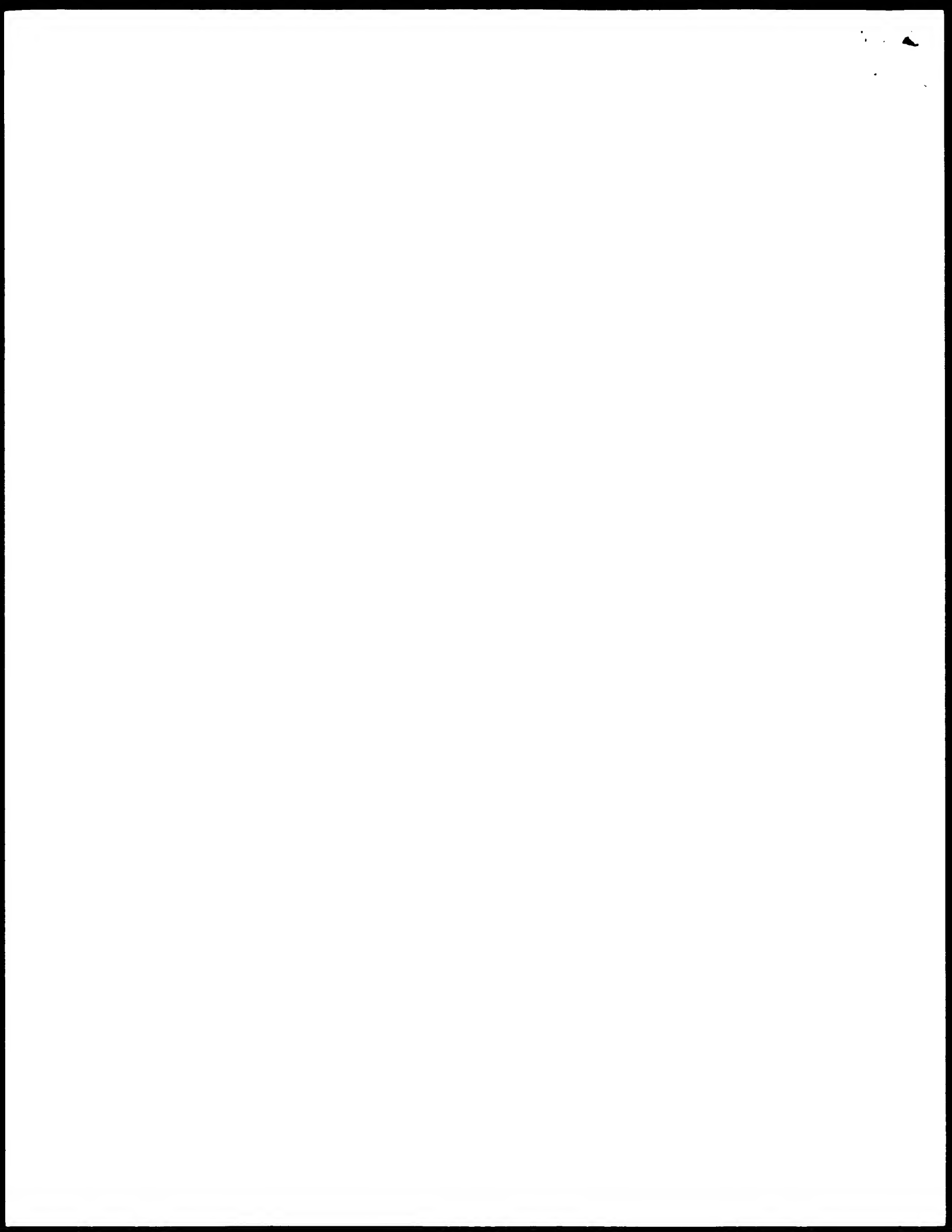
The applicant should also indicate in the letter of reply **any difference** in term of concrete technical feature between the to-be-claimed subject-matter and the prior art and explain the significance thereof in term of inventive step, using the problem-solution approach. In particular he should explain which **technical problem is solved** by the claimed subject-matter and/or which **surprising effect or advantage** is obtained therewith in view of D1.

Additional observations

In order to facilitate the examination of the conformity of the amended application with the requirements of Article 34(2)(b) PCT, the applicant is requested to clearly identify the amendments carried out, no matter whether they concern amendments by addition, replacement or deletion, and to indicate the passages of the application as filed on which these amendments are based (see also Rule 66.8(a) PCT).

If the applicant regards it as appropriate these indications could be submitted in handwritten form on a copy of the relevant parts of the application as filed.

The attention of the applicant is further drawn to the fact that the description should be **in conformity** with any amended claim as required by Rule 5.1(a)(iii) PCT.



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 100.015-VAL	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/ES00/00033	International filing date (day/month/year) 03/02/2000	Priority date (day/month/year) 03/02/1999
International Patent Classification (IPC) or national classification and IPC C02F9/08		
Applicant TECNIDEX, TÉCNICAS DE DESINFECCIÓN, S.A. et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.


2. This REPORT consists of a total of 4 sheets, including this cover sheet.

- ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

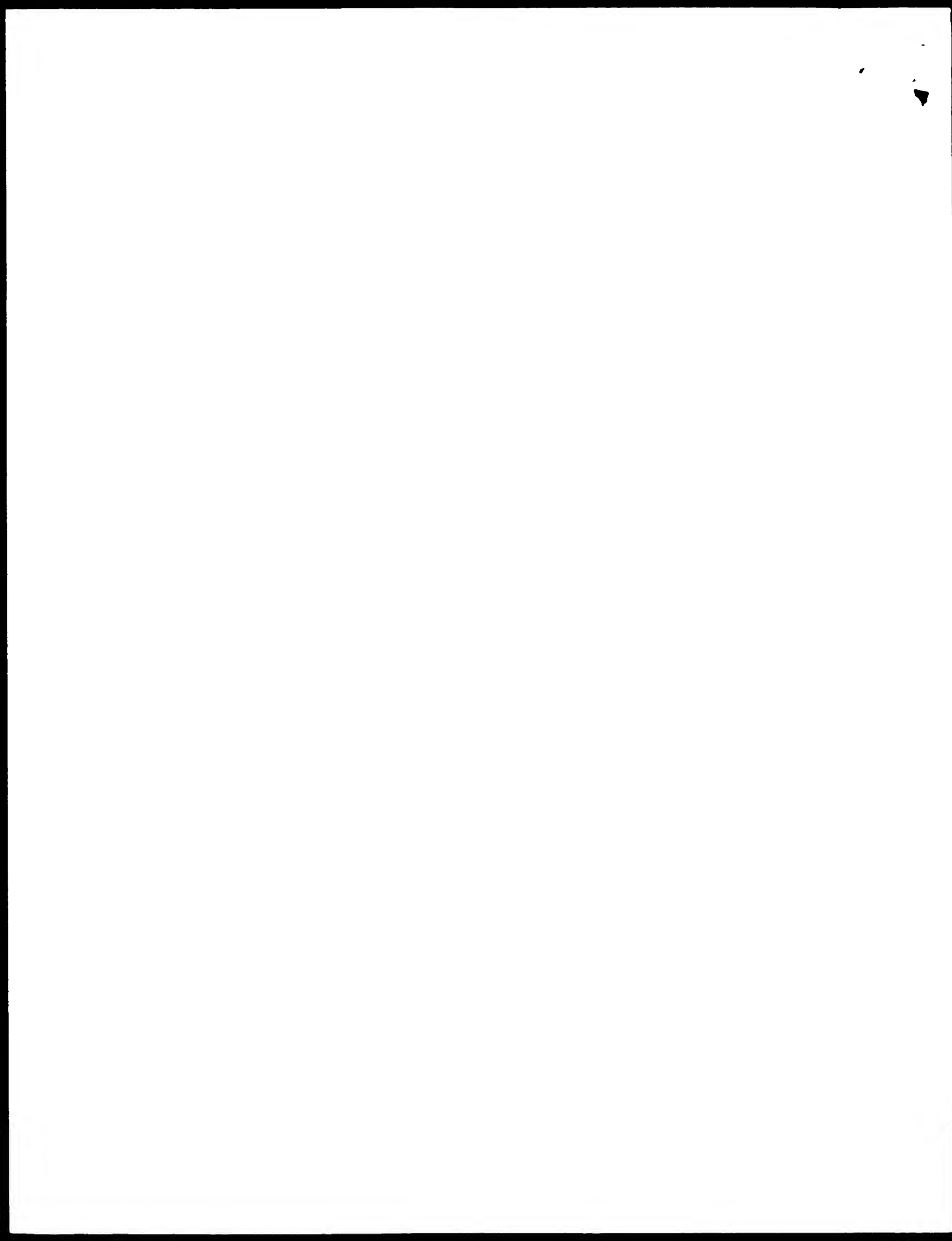
These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 22/08/2000	Date of completion of this report 25.04.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Thomasson, P Telephone No. +49 89 2399 8339





INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/ES00/00033

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-12 as originally filed

Claims, No.:

1-6 with telefax of 09/04/2001

Drawings, sheets:

1/4-4/4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: english , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☒ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/ES00/00033

☐ the drawings, sheets:

5. ☒ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

see separate sheet

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims 1-6
	No: Claims
Inventive step (IS)	Yes: Claims 1-6
	No: Claims
Industrial applicability (IA)	Yes: Claims 1-6
	No: Claims

2. Citations and explanations
see separate sheet



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/ES00/00033

Re Item I

Basis of the report

Claim 1 indicates that the water is retained in **each** carbon column for at least two hours. The originally filed application only discloses that the water is retained in the carbon **columns** for at least two hours without specifying that this contact time applies for each column (see the description on page 11, lines 5-15). Therefore claim 1 introduces subject-matter which extends beyond the content of the application as filed.

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Closest prior art

D1 (EP-A-0 176 912) discloses an apparatus for purifying water which comprises a tank with a filter, a collecting tank and a tower containing activated carbon through which the water flows (see D1: claim 1; figure 1: 1, 3, 4, 7).

2. Novelty

The subject-matter of claim 1 differs from D1 in that it indicates an **array** of columns of activated carbon in combination with some **automatic control means** to provide a contact time of the water in the columns of **at least 2 hours**.

3. Inventive step

The technical problem to be solved against D1 is to improve the purification of the waste water. The use of an array of columns of activated carbon combined with high contact times (batch-mode) allows to solve this technical problem. D1 restricts to the use of a single column of activated carbon combined with a continuous flow of water and neither discloses nor suggests the possibility to use this column in a batch-mode. An inventive step can therefore be recognized.



CLAIMS

1. A purification system for wastewater from fruit- and vegetable-processing plants and from phytosanitary treatments, the system comprising

5 a filter tank (1,15) where a pretreatment step is carried out;

a tank (6,7) for collecting clarified water resulting from the pretreatment step, said tank (6,7) comprising a stirrer (3) for uniformly mixing the
10 clarified water;

pumping means (11) for pumping mixed clarified water from said tank (6,7) to a first active carbon column (9) of an array of active carbon columns (9) being prepared for purifying the mixed clarified water by adsorption up
15 to established threshold values;

said first active carbon column (9) being connected by an outlet to an inlet of a subsequent active carbon column (9), each further subsequent active carbon column (9) being connected by its inlet to the outlet of the
20 preceding active carbon column (9); and

automatic control means for providing that mixed clarified water is retained in each carbon column (9) for at least two hours.

25 2. A purification equipment according to claim 1, characterised in that the tank-filter (1) is a settling tank with at least two outlets for the clarified water, to which flocculent can be added, the sludge being extracted by gravity through the lower part thereof and
30 sent to a filtering bag (5) where it is retained, while the clarified water is sent to an intermediate tank (7), being joined to this the water which passes through said filtering bag (5) and is received in a collection tank (6).

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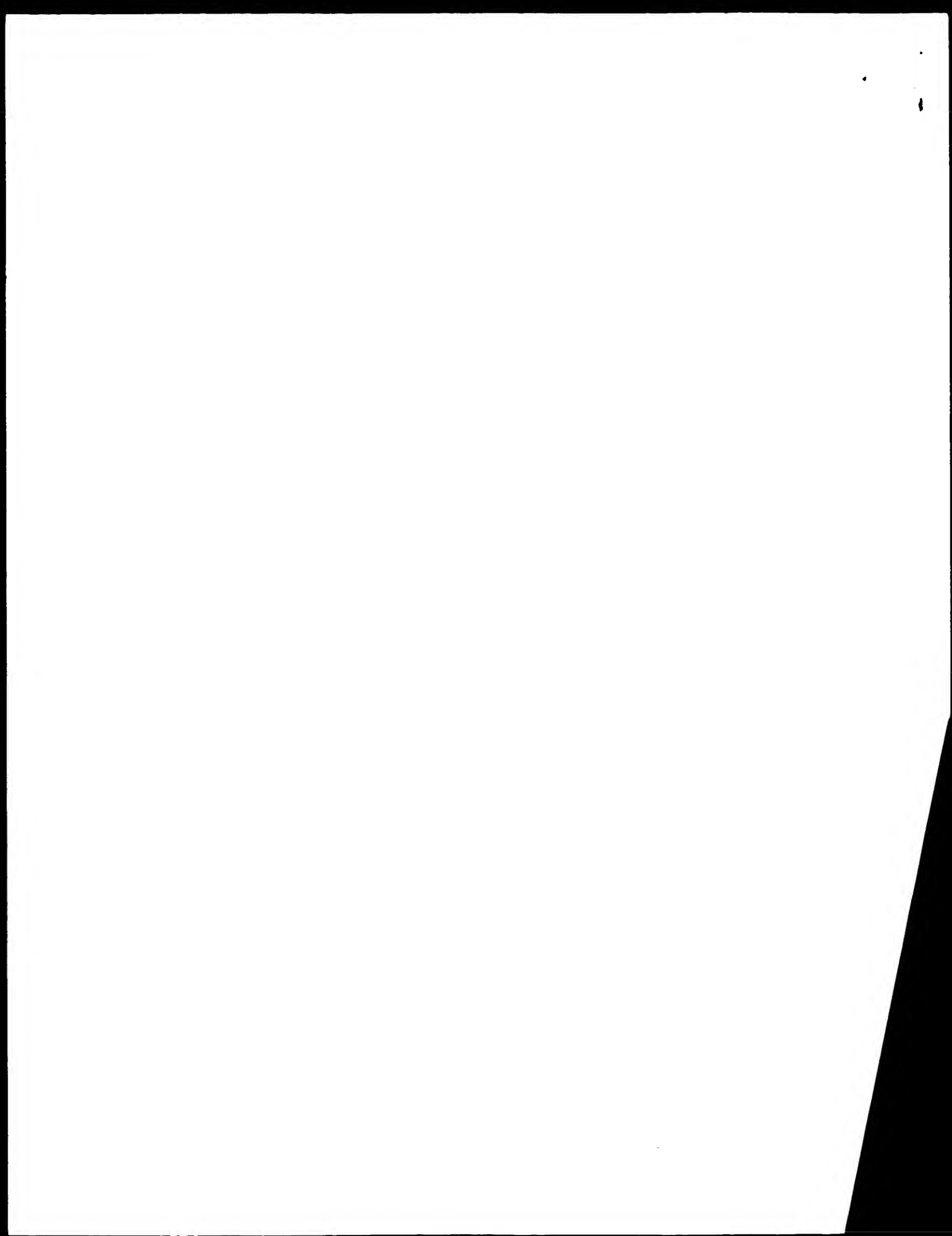
3. A purification equipment according to claim 2, characterised in that the filtering bag (5) is arranged inside a metal frame (4) which acts as a support for it and as a collector for the water passing through it on its way to the reception tank (6).

4. A purification equipment according to claim 1, characterised in that the tank-filter (15) is a polypropylene bag filter that includes diatomaceous earth, with circulation being maintained in closed circuit from the tank (6) containing water, the bags being filled with a pre-layer of this earth; a pump (11a) sucking the liquid to be purified and which passes through that filter (15) to the reception tank (6), from where it is decanted to the array of columns 9 of activated carbon.

5. A purification equipment according to any of the preceding claims, characterised in that at the outlet from the array of columns 9 of activated carbon is included an ultraviolet lamp (13) for optimising the purification.

6. A purification equipment for wastewater coming from fruit and vegetable processing plants and phytosanitary treatments in the field, according to any of the above claims, characterised in that the array of columns 9 of activated carbon, three in number, are mounted on a rotating plate (17) where there exists a fourth bottle (9) in reserve, which replaces number three when the first one becomes clogged up and is withdrawn and replaced by the second, with the third taking over in the second place.

35



PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

UNGRIA LOPEZ, Javier
Avenida Ram n y Cajal, 78
E-28043 Madrid
ESPAGNE

HR/RK(C)

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Rule 71.1)

Date of mailing
(day/month/year) 25.04.2001

Applicant's or agent's file reference
100.015-VAL

IMPORTANT NOTIFICATION

International application No.
PCT/ES00/00033

International filing date (day/month/year)
03/02/2000

Priority date (day/month/year)
03/02/1999

Applicant
TECNIDEX, TÈCNICAS DE DESINFECCI N,S.A. et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

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ATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)


Applicant's or agent's file reference 100.015-VAL	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/ES00/00033	International filing date (day/month/year) 03/02/2000	Priority date (day/month/year) 03/02/1999
International Patent Classification (IPC) or national classification and IPC C02F9/08		
Applicant TECNIDEX, TÈCNICAS DE DESINFECCI N.S.A. et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:
 - I ☒ Basis of the report
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 22/08/2000	Date of completion of this report 25.04.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Thomasson, P Telephone No. +49 89 2399 8339





INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/ES00/00033

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-12 as originally filed

Claims, No.:

1-6 with telefax of 09/04/2001

Drawings, sheets:

1/4-4/4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: english , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☒ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/ES00/00033

☐ the drawings, sheets:

5. ☒ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

see separate sheet

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-6
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-6
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-6
	No:	Claims	

2. Citations and explanations
see separate sheet



Re Item I

Basis of the report

Claim 1 indicates that the water is retained in **each** carbon column for at least two hours. The originally filed application only discloses that the water is retained in the carbon **columns** for at least two hours without specifying that this contact time applies for each column (see the description on page 11, lines 5-15). Therefore claim 1 introduces subject-matter which extends beyond the content of the application as filed.

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Closest prior art

D1 (EP-A-0 176 912) discloses an apparatus for purifying water which comprises a tank with a filter, a collecting tank and a tower containing activated carbon through which the water flows (see D1: claim 1; figure 1: 1, 3, 4, 7).

2. Novelty

The subject-matter of claim 1 differs from D1 in that it indicates an **array** of columns of activated carbon in combination with some **automatic control means** to provide a contact time of the water in the columns of **at least 2 hours**.

3. Inventive step

The technical problem to be solved against D1 is to improve the purification of the waste water. The use of an array of columns of activated carbon combined with high contact times (batch-mode) allows to solve this technical problem. D1 restricts to the use of a single column of activated carbon combined with a continuous flow of water and neither discloses nor suggests the possibility to use this column in a batch-mode. An inventive step can therefore be recognized.



CLAIMS

1. A purification system for wastewater from fruit- and vegetable-processing plants and from phytosanitary treatments, the system comprising

5 a filter tank (1,15) where a pretreatment step is carried out;

a tank (6,7) for collecting clarified water resulting from the pretreatment step, said tank (6,7) comprising a stirrer (3) for uniformly mixing the
10 clarified water;

pumping means (11) for pumping mixed clarified water from said tank (6,7) to a first active carbon column (9) of an array of active carbon columns (9) being prepared for purifying the mixed clarified water by adsorption up
15 to established threshold values;

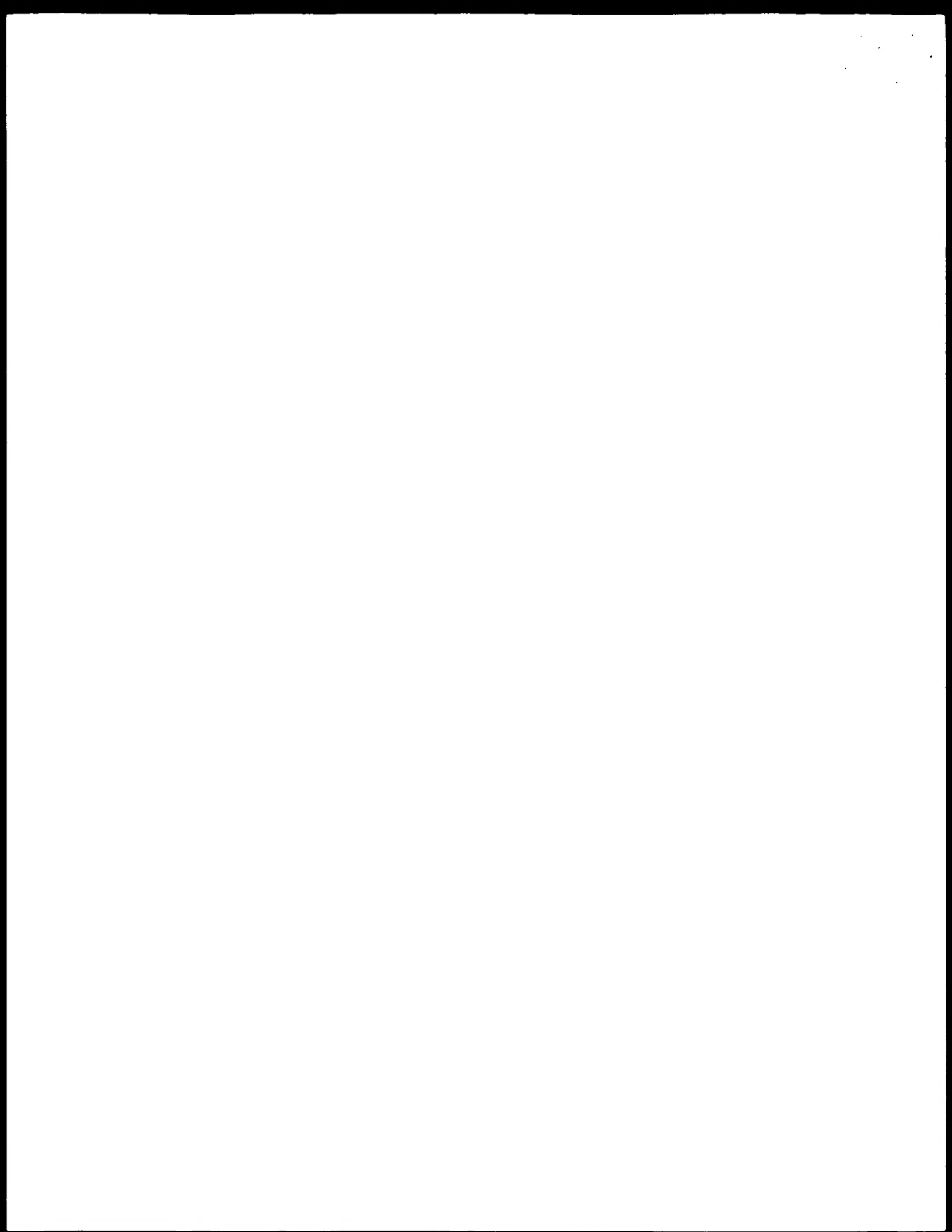
said first active carbon column (9) being connected by an outlet to an inlet of a subsequent active carbon column (9), each further subsequent active carbon column (9) being connected by its inlet to the outlet of the
20 preceding active carbon column (9); and

automatic control means for providing that mixed clarified water is retained in each carbon column (9) for at least two hours.

25 2. A purification equipment according to claim 1, characterised in that the tank-filter (1) is a settling tank with at least two outlets for the clarified water, to which flocculent can be added, the sludge being extracted by gravity through the lower part thereof and
30 sent to a filtering bag (5) where it is retained, while the clarified water is sent to an intermediate tank (7), being joined to this the water which passes through said filtering bag (5) and is received in a collection tank (6).

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3. A purification equipment according to claim 2, characterised in that the filtering bag (5) is arranged inside a metal frame (4) which acts as a support for it and as a collector for the water passing through it on its way to the reception tank (6).

4. A purification equipment according to claim 1, characterised in that the tank-filter (15) is a polypropylene bag filter that includes diatomaceous earth, with circulation being maintained in closed circuit from the tank (6) containing water, the bags being filled with a pre-layer of this earth; a pump (11a) sucking the liquid to be purified and which passes through that filter (15) to the reception tank (6), from where it is decanted to the array of columns 9 of activated carbon.

5. A purification equipment according to any of the preceding claims, characterised in that at the outlet from the array of columns 9 of activated carbon is included an ultraviolet lamp (13) for optimising the purification.

6. A purification equipment for wastewater coming from fruit and vegetable processing plants and phytosanitary treatments in the field, according to any of the above claims, characterised in that the array of columns 9 of activated carbon, three in number, are mounted on a rotating plate (17) where there exists a fourth bottle (9) in reserve, which replaces number three when the first one becomes clogged up and is withdrawn and replaced by the second, with the third taking over in the second place.

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PCT ORGANIZACION MUNDIAL DE LA PROPIEDAD INTELECTUAL
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(81) Estados designados: AU, BR, CA, CN, CR, CU, IL, IN, JP, MA, MX, NZ, RU, TR, US, ZA, Patente europea (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Publicada

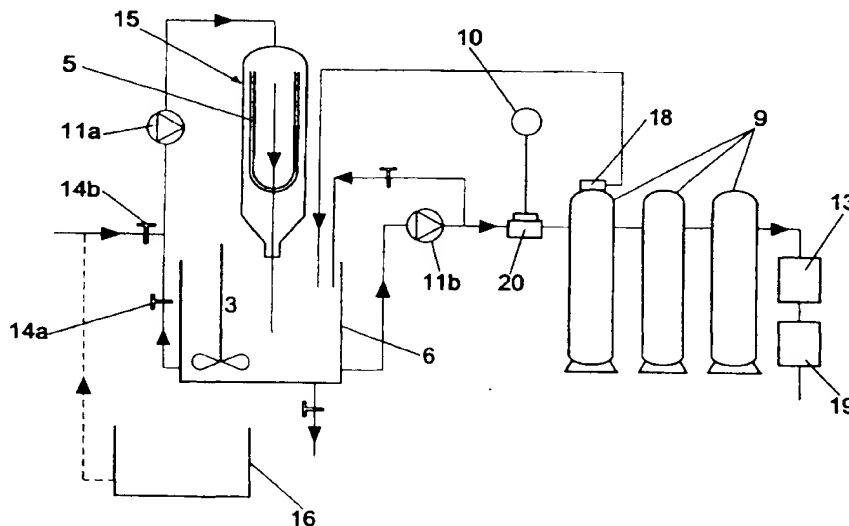
Con informe de búsqueda internacional.

(54) Title: EQUIPMENT FOR PURIFYING RESIDUAL WATERS FROM HORTICULTURE AND POMOLOGY CENTERS AND IN SITU PHYTOSANITARY TREATMENT

(54) Título: EQUIPO DE DEPURACION DE AGUAS RESIDUALES DE CENTRALES HORTOFRUTICOLAS Y TRATAMIENTOS FITOSANITARIOS EN CAMPO

(57) Abstract

Said equipment includes a tank-filter (1, 15) in which a pretreatment stage is carried out. The tank (1) is a decanter to which a flocculant that is uniformly mixed with an agitator (3) can be added. The sludge is removed by delivering it to a filter bag (5). The permeates are then fed to a collecting tank (6) and pumped to the same tank (7) receiving the clarified waters. The permeates are then decanted from said tank (7) through a safety filter (8) to a battery of activated carbon columns (9) where they are purified by adsorption until the established threshold values have been reached. In another embodiment, the reservoir-filter (15) is a polypropylene bag filter with diatomaceous earth, wherein the liquid passes directly to the decanting tank and is then pumped to the battery of activated carbon columns (9).



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**EQUIPO DE DEPURACION DE AGUAS RESIDUALES DE CENTRALES
HORTOFRUTICOLAS Y TRATAMIENTOS FITOSANITARIOS EN CAMPO**

OBJETO DE LA INVENCION

5 La presente invención, según lo expresa el
enunciado de esta memoria descriptiva, se refiere a un
equipo de depuración de aguas residuales de centrales
hortofrutícolas y tratamiento fitosanitarios en campo, con
el que se aportan notables características relevantes y
ventajosas frente a los actuales equipos de depuración
10 convencionales.

Se depuran las aguas residuales de los
productos químicos generadas en las centrales hortofrutí-
colas, en los distintos sistemas de aplicación que se
utilizan, drenchers (duchadoras de palets), aplicadores de
15 fungicidas, aplicadores de ceras, líneas de tratamiento y
balsas de tratamiento, etc.; así como la depuración de
caldos de vertidos sobrantes de tratamientos fitosani-
tarios en campo.

ANTECEDENTES DE LA INVENCION

20 Para depuración de aguas contaminadas con
plaguidas, se sigue actualmente una secuencia de trata-
miento: filtración convencional-carbón activado-degrada-
ción biológica, tal como lo contempla el sistema de
descontaminación de la patente de invención con número de
25 publicación ES2050909, referido a la desintoxicación de
soluciones que pueden contener sustancias tóxicas, tales
como residuos de plaguicidas.

El sistema consta de un depósito donde se
recoge el líquido, equipado con un cesto de rejilla, con
30 una abertura de rejilla de 0,8 mm. El depósito tiene una
entrada de aire para la introducción de aire comprimido
que se mezcla con el líquido, mejorando la degradación de
materiales tóxicos en el líquido.

Se establecerá el nivel de toxicidad del agua
35 del depósito para según esté, transferir a los subsistemas

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de descontaminación apropiados.

Con un nivel de toxicidad elevado, el agua se lleva a un depósito de retención, alimentado con una fuente constante de aire comprimido.

5 El líquido tratado se pasa por un reactor de lecho de tierra. El reactor comprenderá una capa de tierra sobre una serie de bloques de hormigón permeable. El líquido se aplica a la parte superior de la capa de tierra mediante una red de tuberías de riego por goteo convencional.
10 El reactor de lecho de tierra contiene microorganismos que utilizan como nutrientes los materiales orgánicos empleados como plaguicidas.

El líquido se desvía del filtro de tierras a un filtro de carbón activado. Este filtro puede incluir
15 una capa de alúmina que lleva permanganato potásico para oxidar materiales tóxicos.

La fase final del sistema de descontaminación es un estanque de pulido, es decir, una piscina abierta y permeable. En este estanque no solo se elimina por evaporación una parte sustancial del agua, sino que mejora
20 adicionalmente la calidad del agua, eliminando trazas de plaguicidas. El estanque estará poblado de especies animales y plantas para la degradación adicional del material orgánico contenido en el agua.

25 Si se desea, se puede incluir una unidad de ozonización convencional en el sistema para introducir ozono en el depósito de rotación.

Otro sistema conocido prevé una secuencia de tratamiento: lechos de filtración con carbón-degradación
30 con microorganismos específicos. Este método y sistema de tratamiento de agua está contemplado en la patente de invención con número de publicación: WO 94/29224. Contempla un sistema para depurar aguas con alto contenido en componentes orgánicos, como residuos de compuestos químicos
35 agrícolas y baja DBO.

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Se utiliza un material poroso como medio de filtración, carbón, sobre el que existe un substrato de microorganismos específicos (del grupo Pseudomonas). El agua entra en contacto con estos microorganismos bajo condiciones aerobias.

El sistema consta de cinco tanques en serie por los que circulará el agua residual.

Siguiendo una secuencia de tratamiento: carbón activado-filtración, podemos citar el modelo de utilidad número 9301506 referido a un depurador de aguas residuales que comprende una cuba o tolva provista de un agitador y un depósito comunicado inferiormente con la misma a través de una válvula intermedia de paso. A la cuba llega el líquido contaminado procedente de la zona de tratamiento de frutas y otros vegetales, por medio de una tubería e impulsado por una bomba de tal manera que el fluido contaminado contenido en la tolva junto con una cantidad de carbón activo es removido por un agitador.

Cuando el agitador se detiene se abre la válvula y los elementos contaminantes adheridos al carbón caen por decantación al depósito inferior del cual se extrae.

Existen además unos filtros y una columna de filtración para limpiar totalmente de impurezas el contenido de la cuba. El líquido se hace pasar por los filtros, de modo que cerrando unas llaves anterior y posterior a una bomba de impulsión y abriendo otras, se impide por un lado la circulación del fluido que va desde la zona de tratamiento de frutas y otros vegetales hasta la cuba, mientras que por otro lado, se facilita la circulación del fluido procedente de la cuba a través del circuito de filtros.

En la patente de invención con número de publicación 0447923A1 referido a un medio de adsorción polimérico, se da a conocer un medio de filtración efectivo para aceites y grasas, hidrocarburos líquidos,

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esteroles, plaguicidas orgánicos, y otros compuestos líquidos inertes con enlaces orgánicos y sus mezclas.

El medio de filtración está compuesto por polivinilacetato, cuyas partículas tienen una estructura porosa. El polivinilacetato se encuentra en forma de láminas, en particular construidas en forma de sandwich conteniendo partículas de polivinilbutiral, y de polivinilacetato que forman estructuras multicámara.

Empleando una secuencia de tratamiento: biológico con cepas específicas, cabe citar la patente de invención ES2095193 referida a la utilización de las cepas bacterianas del género pseudomonas PCH3 y GCH1 para la biorestauración de suelos y purificación de aguas contaminadas por herbicidas del grupo de las acetamidas. Este sistema se caracteriza por utilizar al menos una de las cepas pseudomonas PCH3 y GCH1 para la biotransformación de aguas contaminadas con herbicidas. Para ello se deben añadir los nutrientes necesarios para conseguir la optimización de la biotransformación. Se debe inocular el agua a tratar en un cultivo con al menos uno de los microorganismos anteriormente citados, que estará inmovilizado sobre un soporte sólido, de naturaleza cerámica, sintética u orgánica. El microorganismo inmovilizado se aporta, como biocatalizador, a un biorreactor, regulándose las condiciones que optimizan el proceso de transformación de los compuestos contaminantes.

Con una secuencia de tratamiento: filtración-ultravioleta, puede citarse la patente de invención ES2027366 por aparato para el tratamiento de agua. Está diseñado para depuración de agua de consumo, por lo que constan de un sistema de depuración de compuestos tóxicos preparado para retener trazas.

Este aparato consta de una cabeza que tiene un orificio de entrada de agua y otro de salida y de un conjunto de partes montadas en el que incluyen unos medios

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de filtración y unos medios de radiación.

El medio de filtración puede ser de fibras mecánicas y/o materiales químicos de adsorción, y es preferentemente del tipo de carbón activado de sección transversal granular.

EL diámetro interno del medio de filtración es un poco superior al diámetro externo del medio de irradiación. El medio de irradiación incluye una lámpara ultravioleta, con o sin ozono.

Utilizando también una secuencia de tratamiento: (ozono) -ultravioleta- carbón activado, puede citarse la patente de invención WO94/25401 por unidad de purificación de agua. Este sistema está diseñado para depuración de agua de consumo y contiene un sistema de retención de compuestos tóxicos preparado para retener trazas. El agua a purificar gira bajo una fuente de radiación ultravioleta y seguidamente fluye a través de un filtro de carbón activado montado sobre la fuente ultravioleta. El efluente del filtro se vuelve a pasar por la fuente de radiación ultravioleta. La fuente de radiación ultravioleta eliminará los microorganismos presentes y el filtro retendrá partículas y otros compuestos.

Se puede incorporar un generador de ozono en la entrada de agua que potencia la destrucción de los microorganismos presentes y oxida los componentes indeseables del agua.

DESCRIPCION DE LA INVENCION

En líneas generales, el equipo de depuración de aguas residuales de centrales hortofrutícolas y tratamientos fitosanitarios en campo, que constituye el objeto de la invención, incluye básicamente los siguientes elementos:

En primer lugar dispone de un depósito de decantación, de tipo troncocónico y fabricado en políester reforzado con fibra de vidrio, de 500 l. de capacidad

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aproximadamente. Este depósito constará de dos o más salidas a distinta altura para el clarificado, una de las cuales está dispuesta al comenzar la base cónica y otra a un nivel superior y más concretamente a un 50% de la altura de la parte cilíndrica de dicho depósito. Cuenta con un sistema de dosificación de floculante y un agitador para producir una buena mezcla. Un sistema de filtración de fangos dispuesto a la salida del depósito, pasando a una bolsa filtrante de aproximadamente 820 mm de longitud y 180 mm de diámetro, fabricada en nylon monofilamento y con un paso de 60 a 75 micras. El producto filtrado en la bolsa filtrante pasa a un depósito de recogida de aproximadamente 50 l y de aquí se bombea a un depósito intermedio de dimensiones similares a las del decantador.

Del depósito intermedio el producto filtrado pasa a un filtro de anillas autolimpiante, de 75 micras de paso y después se ha de pasar por unas columnas de carbón activo, normalmente en número de 1 a 3, del orden de 300 l de volumen y que contienen aproximadamente 100 Kg de carbón. Están fabricadas en polietileno con refuerzo exterior de fibra de vidrio y resina epoxi.

Existe un sistema de alarma luminoso para indicación de agotamiento del carbón activo, así como bombas y valvulería necesaria para la instalación.

El agua residual se bombea desde el deposito del drenchers con bombas convencionales.

En ocasiones, a la salida de la batería de columnas de carbón activo, se incorpora una lámpara ultravioleta para garantizar mayor grado de depuración.

El sistema incorpora un mecanismo de contralavado que permite obtener un mayor rendimiento de las columnas de carbón activo.

Para facilitar la comprensión de las características de la invención y formando parte integrante de esta memoria descriptiva, se acompaña una hoja de planos

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en cuya figura única, con carácter ilustrativo y no limitativo se ha representado lo siguiente:

BREVE DESCRIPCION DE LOS DIBUJOS

5 **Figura 1.-** Es un esquema del funcionamiento del equipo de depuración de aguas residuales de centrales hortofrutícolas y tratamientos fitosanitarios en campo, acorde con la invención.

10 **Figura 2.-** Es otra vista esquemática, similar a la figura 1, incorporando una lámpara ultravioleta.

10 **Figura 3.-** Muestra una instalación para realizar el proceso de depuración, incluyendo un filtro de presión con bolsas filtrantes preparadas con una precapa de tierra de diatomea.

15 **Figura 4.-** Es una vista en perspectiva del soporte giratorio portador de las botellas de carbón activo.

DESCRIPCION DE LA FORMA DE REALIZACION PREFERIDA

20 Haciendo referencia a la numeración adoptada en la figura 1, podemos ver cómo el equipo de depuración de aguas residuales de centrales hortofrutícolas y tratamientos fitosanitarios en campo, que la invención propone, incluye un sistema de decantación del agua residual procedente de drenchers de lavado de frutas. Su función es separar los sólidos en suspensión que contiene el agua residual, estando compuesto por un decantador 1 al que llega el agua residual y donde puede añadirse floculante mediante el sistema de floculación 2, mezclando con un agitador 3. Tras la decantación se extraen los fangos por la parte inferior del depósito y el agua clarificada se trasiega al depósito intermedio 7.

30 Los rendimientos aproximados en la decantación utilizando floculante son:

- Sólidos en suspensión: 50%
- DQO: 20%
- 35 - Imazalil: 20%

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- Tiabendazol: 80%

Incluye también un sistema de tratamiento de fangos, los cuales son extraídos por gravedad del fondo del decantador y llegan a la bolsa filtrante 5, donde quedan retenidos, filtrándose a través de la misma, parte del agua que contienen. La bolsa filtrante 5 está dispuesta en posición vertical en el interior de un bastidor metálico 4 que le sirve de sujeción y de colector de su permeado hacia el depósito de recogida 6. Este permeado es bombeado desde el depósito 6 a un depósito intermedio 7, donde se une con el agua clarificada. La sequedad de fango alcanzada mediante el sistema de bolsas filtrante es del orden del 50%.

El agua clarificada y el permeado de la bolsa filtrante, recogidas en el depósito intermedio 7, se bombean a través del filtro de anillas 8. Este filtro actúa como filtro de seguridad de las columnas de carbón activo, reteniendo los sólidos remanentes en el agua.

El equipo incluye también las columnas de carbón activo, en número de 3 en este ejemplo de realización mostrado en el esquema. El agua clarificada, tras su paso por el filtro de seguridad 8 llega a las columnas de carbón activo 9, donde se depurará por adsorción, eliminándose las sustancias tóxicas hasta los valores límite que marca la Legislación. El sistema de alarma luminoso 10 indicará el agotamiento y conveniencia de reemplazo de la primera columna de carbón activo 9.

La referencia 11 designa las bombas y valvulería necesaria.

Los rendimientos aproximados que se consiguen en las columnas de carbón son del orden:

Sólidos en suspensión: 90%

DQO: 85%

Imazalil: 100%

Tiabendazol: 100%

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Los valores de ecotoxicidad del agua depurada serán menores de 2 U.T.

5 En el esquema se ha referenciado con A el sistema de decantación del caldo final procedente de drenchers, el cual accede por la boca de carga del depósito de decantación 1, como lo muestra la flecha. En el diagrama de la figura 1 está referenciado con B el bloque de columnas de carbón activo 9. El bloque referenciado con C corresponde al sistema de tratamiento de fangos.

10 Las flechas que aparecen mostradas en el diagrama indican el recorrido del producto a depurar, por la instalación; obteniéndose el agua tratada a la salida del bloque B de columnas de carbón activo 9.

15 En la figura 2 se ha mostrado esquemáticamente una instalación que incluye la lámpara ultravioleta 13 que garantiza mayor grado de depuración, recogiendo el producto en el depósito 12, del que sale hacia el desagüe.

20 A continuación se va a realizar una descripción de la instalación en la que se lleva a cabo el proceso de depuración, con referencia especial a la figura 3, donde se contempla otra forma de realización de la invención.

25 El dimensionado de los componentes del equipo se ha determinado para un volumen de caldo de trencher a depurar, de 460 l/h, debiendo dimensionarse para diferentes caudales y cargas contaminantes.

30 Para iniciar el proceso de depuración se introduce en el depósito 6 (con una capacidad del orden de 500 l y de forma automática o manual) unos 40 l de agua y se conecta el agitador 3, así como la bomba 11a en circuito cerrado, a través del filtro de bolsas 15 y la llave 14a. A continuación se van añadiendo poco a poco las tierras de diatomeas y se mantiene la recirculación durante un mínimo de 5 minutos.

35 Una vez transcurrido el tiempo de recircula-

- 10 -

ción, las bolsas filtrantes 5 de este filtro de presión 15, se encuentran preparadas con una precapa de tierras de diatomea. En ese momento se cierra la electroválvula 14a y se abre la número 14b por lo que la bomba 11a procede a aspirar los caldos a depurar y los introduce en el depósito 6 con un filtrado de sólidos inferior a 50 micras.

En este filtro de presión 15 tiene lugar una etapa de pretratamiento o acondicionamiento del vertido. En una segunda etapa se produce el tratamiento final o reducción de la carga contaminante.

En esta primera etapa de pretratamiento, lo que se pretende es reducir la carga de sólidos presentes en las aguas provenientes del drencher, y proceder a una primera reducción de la carga contaminante. Con este fin se dispone un filtro de bolsas de polipropileno (de no más de 50 micras) que retendría todos aquellos sólidos mayores de este tamaño de poro. Como ayuda al sistema de filtración se incorporan tierras de diatomeas, formando una precapa en el interior de las bolsas de polipropileno, aprovechando la permeabilidad selectiva de estas tierras y el poder que tienen de adsorción de aceites.

El objetivo es múltiple:

- Ayuda a la filtración, mejorando ésta al evitar una colmatación rápida.
- Retención de un pequeño tanto por ciento de aceites de los preparados.
- Proteger las paredes de la bolsa alargando su vida.

El resultado final del conjunto bolsa-tierras de diatomeas es:

- Reducción muy alta de sólidos sedimentables.
- Reducción alta de sólidos en suspensión.
- Reducción de la carga de fungicidas.
- Reducción de los aceites presentes.

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En el caso de proceder a la depuración de las aguas de línea, previamente éstas serían almacenadas en un depósito de retención 16 del tamaño adecuado para ser depuradas a la velocidad necesaria.

5 Una vez los caldos se encuentran filtrados en el depósito 6, la bomba 11b se pone en marcha impulsando los caldos a través de tres botellas 9 de carbón activo que definen la batería de columnas 9, teniendo éstas un volumen del orden de 316 l cada una. Se debe garantizar una
10 permanencia mínima de dos horas del caldo dentro de las botellas 9 de carbón activo, para lo cual existe un contador de litros con salida electrónica conectado a un automatismo eléctrico que impide que la bomba siga impulsando caldo hasta que el que se encuentra en el interior de
15 las botellas 9 haya permanecido un mínimo de dos horas en el interior de las mismas. Por otro lado, este contador volumétrico será el encargado de avisar de la necesidad de sustituir el carbón activo de la primera botella 9 al llegar a su agotamiento, pudiéndose conectar un avisador
20 telefónico para que la empresa suministradora proceda al cambio. El equipo ha sido diseñado para poder incorporar una cuarta botella 9 de carbón activo, tal y como se muestra en la figura 4. De esta forma se permitiría reemplazar fácilmente la tercera botella por la de repues-
25 to; pasar esta tercera botella a la posición precedente; ocupando la segunda botella la primera posición, una vez que ha sido retirada la colmatada. Estas cuatro botellas 9 se encuentran en un plato giratorio 17, realizándose todo este proceso de permutación mediante un simple giro
30 motorizado o manual, de 90º como se deduce fácilmente al observar la figura.

 El control del equipo lo efectúa un autómata programable conectado a una pantalla táctil que permite por parte del usuario la programación de todos los pará-
35 metros operativos del equipo, con registros de caudales y

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consumos, avisos de sustituciones, etc., permitiendo su conexión a un ordenador personal para mayor versatilidad de manejo, y éste a su vez a otro remoto vía modem permitiendo el telecontrol.

5 La primera botella filtrante 9 incorpora una
válvula de contralavado 18 que permite efectuar este
proceso en caso de apelmazarse el carbón activo de la
primera botella 9, ya que es la que sufre la mayor carga
contaminante. Este proceso se puede realizar de forma
10 automática una vez que la presión diferencial entre la
entrada y la salida supera un determinado valor. El
resultado del contralavado se devuelve al depósito 6 para
tratarse como una parte más del caldo a depurar.

15 Una vez los caldos salen de las botellas 9 de
carbón activo, de forma opcional el caldo antes de ser
vertido sería tratado mediante lámparas ultravioletas 13
y/o un ozonizador 19.

La referencia 20 de la figura 3 designa un
caudalímetro.

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REIVINDICACIONES

1.- EQUIPO DE DEPURACION DE AGUAS RESIDUALES DE CENTRALES HORTOFRUTICOLAS Y TRATAMIENTOS FITOSANITARIOS EN CAMPO, caracterizado porque consta de un depósito-filtro (1, 15) donde se realiza una etapa de pretratamiento, recogién dose el clarificado en un depósito (6-7) mezclando uniformemente con un agitador (3), de donde se trasiega mediante bombeo a una batería de columnas (9) de carbón activo, en las que se depura por adsorción hasta los valores límites establecidos.

2.- EQUIPO DE DEPURACION DE AGUAS RESIDUALES DE CENTRALES HORTOFRUTICOLAS Y TRATAMIENTOS FITOSANITARIOS EN CAMPO, según reivindicación 1, caracterizado porque el depósito-filtro (1) es un decantador con al menos dos salidas para el clarificado y al que puede añadirse floculante, extrayéndose por gravedad los fangos por la parte inferior del mismo y enviados a una bolsa filtrante (5) donde quedan retenidos, mientras que el clarificado es enviado a un depósito intermedio (7), uniéndose a éste el agua que atraviesa dicha bolsa filtrante (5) y es recibido en un depósito (6) de recogida.

3.- EQUIPO DE DEPURACION DE AGUAS RESIDUALES DE CENTRALES HORTOFRUTICOLAS Y TRATAMIENTOS FITOSANITARIOS EN CAMPO, según reivindicación 2, caracterizado porque la bolsa filtrante (5) queda dispuesta en el interior de un bastidor metálico (4) que le sirve de sujeción y de colector de su permeado hacia el depósito de recogida (6).

4.- EQUIPO DE DEPURACION DE AGUAS RESIDUALES DE CENTRALES HORTOFRUTICOLAS Y TRATAMIENTOS FITOSANITARIOS EN CAMPO, según reivindicación 1, caracterizado porque el depósito-filtro (15) es un filtro de bolsas de polipropileno al que se incorporan tierras de diatomeas, manteniendo una recirculación en circuito cerrado, desde el depósito (6) conteniendo agua, llenándose las bolsas con una precapa de estas tierras; aspirando una bomba (11a) los caldos a

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depurar y que pasan por dicho filtro (15) al depósito de recogida (6), del que se trasiega a la batería de columnas (9) de carbón activo.

- 5 **5.- EQUIPO DE DEPURACION DE AGUAS RESIDUALES
DE CENTRALES HORTOFRUTICOLAS Y TRATAMIENTOS FITOSANITARIOS
EN CAMPO**, según una cualquiera de las reivindicaciones
anteriores, caracterizado porque a la salida de la batería
de columnas (9) de carbón activo, se incorpora una lámpara
ultravioleta (13) para optimizar la depuración.
- 10 **6.- EQUIPO DE DEPURACION DE AGUAS RESIDUALES
DE CENTRALES HORTOFRUTICOLAS Y TRATAMIENTOS FITOSANITARIOS
EN CAMPO**, según una cualquiera de las reivindicaciones
anteriores, caracterizado porque la batería de columnas (9)
de carbón activo, en número de tres, se encuentran montadas
15 en un plato giratorio (17) donde existe además una cuarta
botella (9) de repuesto, reemplazando ésta a la número tres
cuando la primera, una vez colmatada, es retirada y
sustituida por la segunda, pasando la tercera a ocupar el
segundo lugar.

20

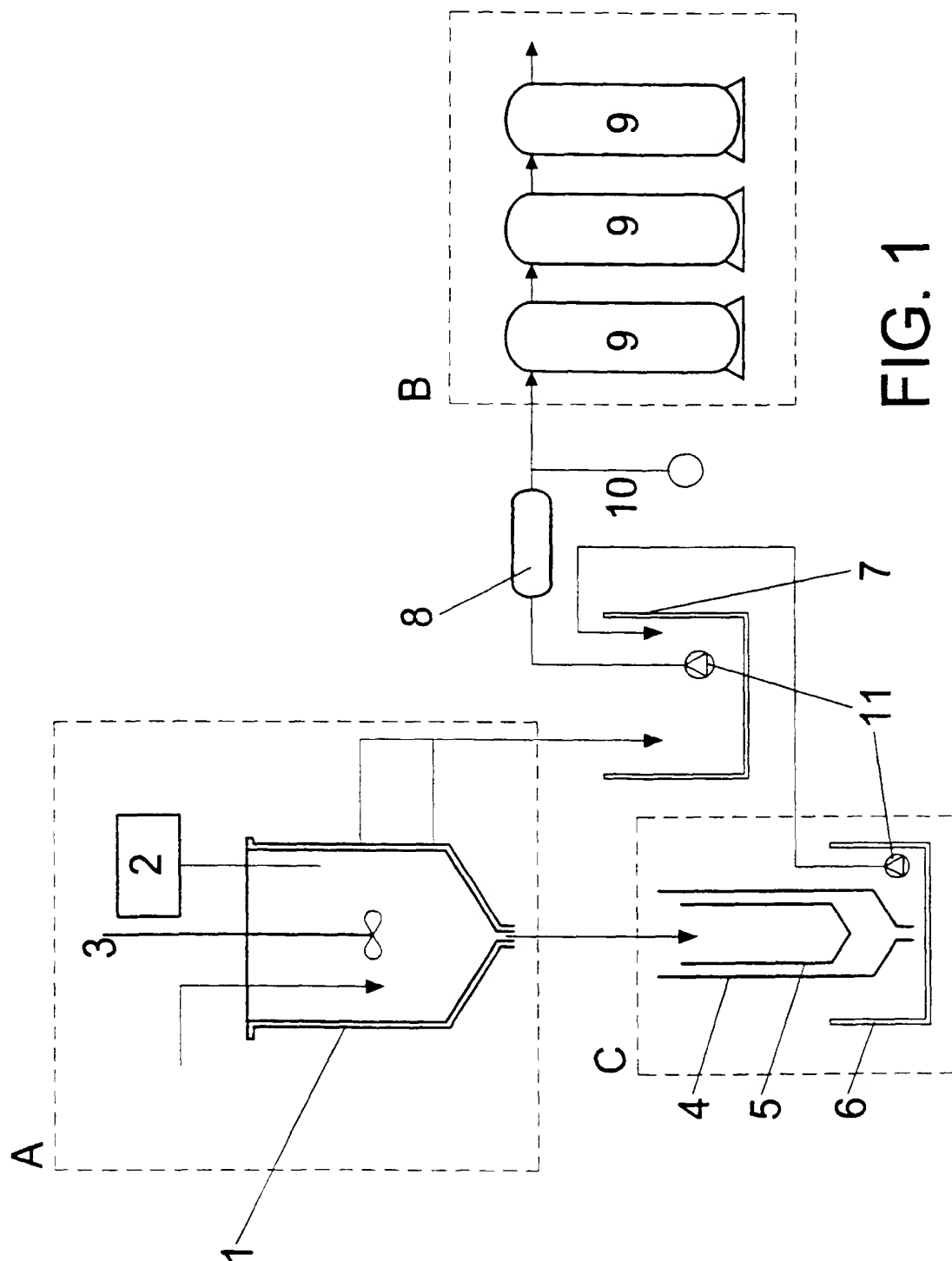
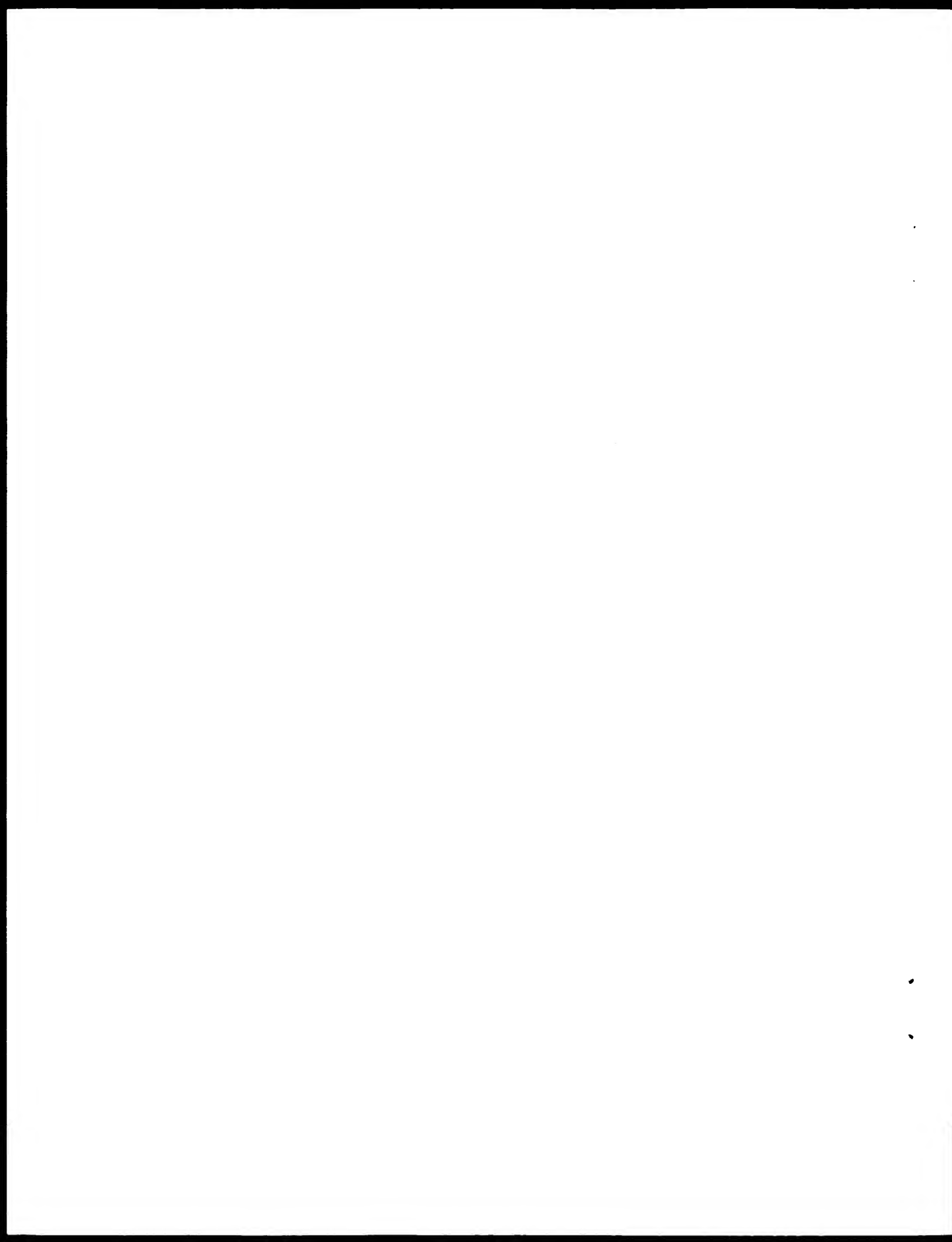


FIG. 1



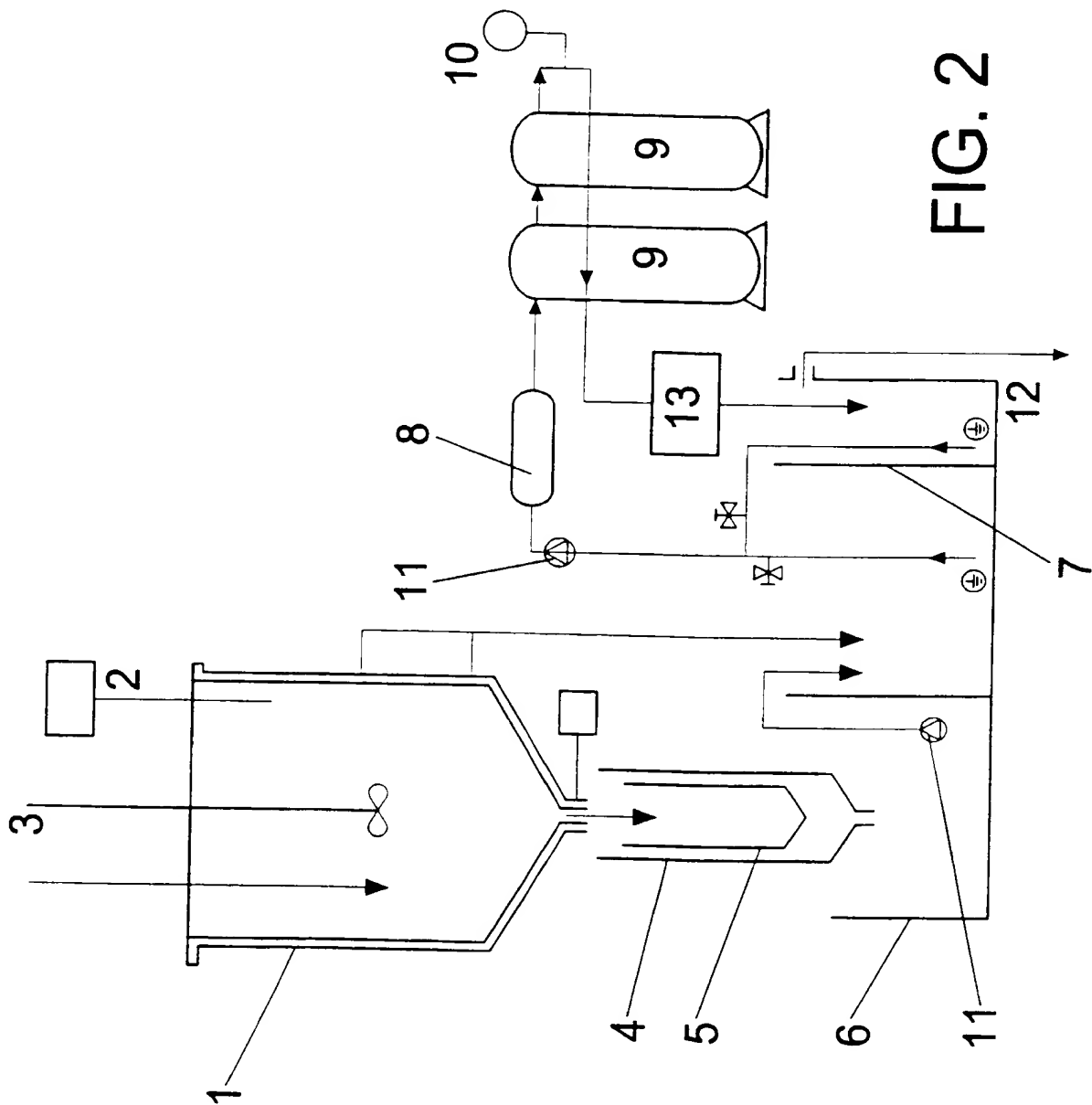
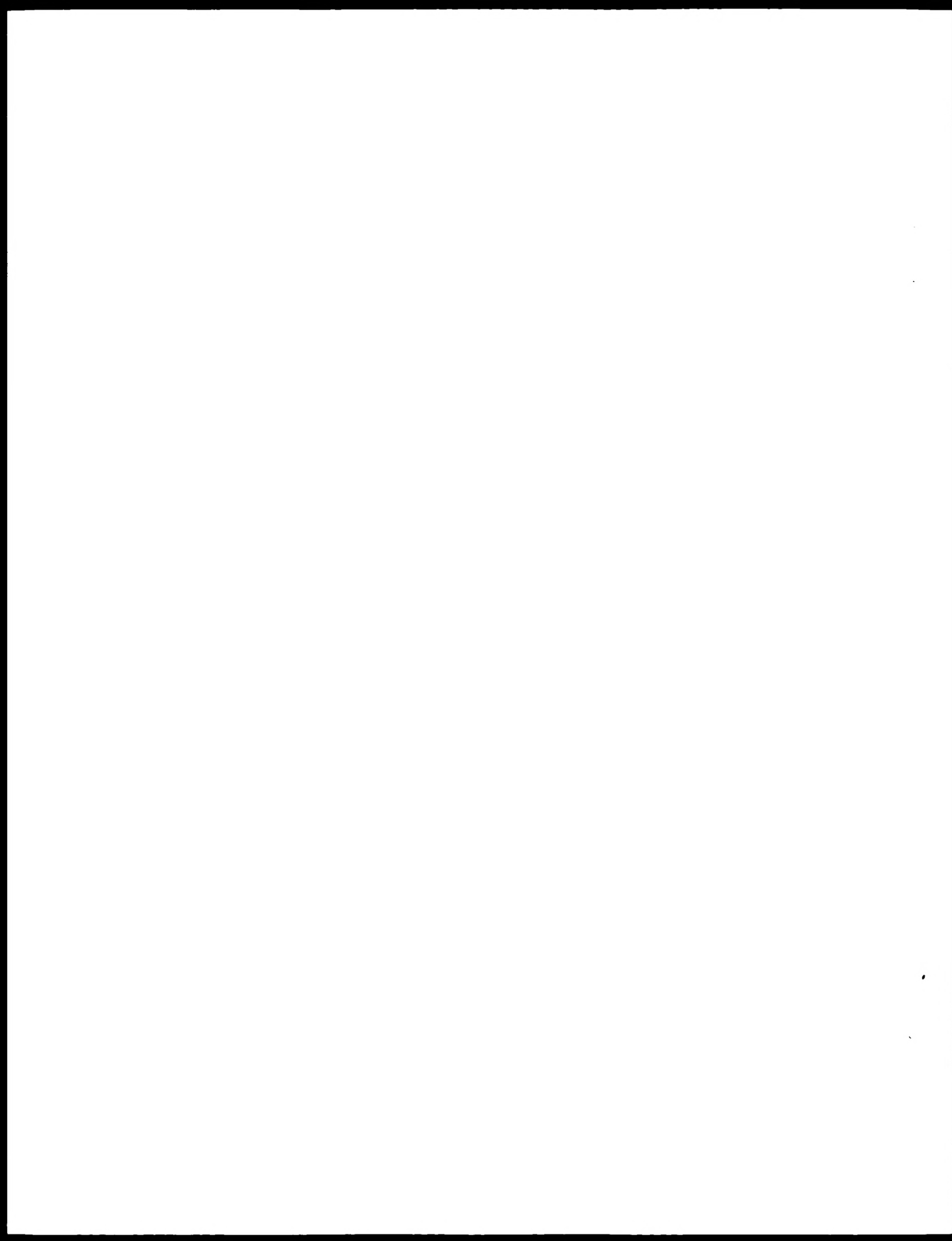


FIG. 2



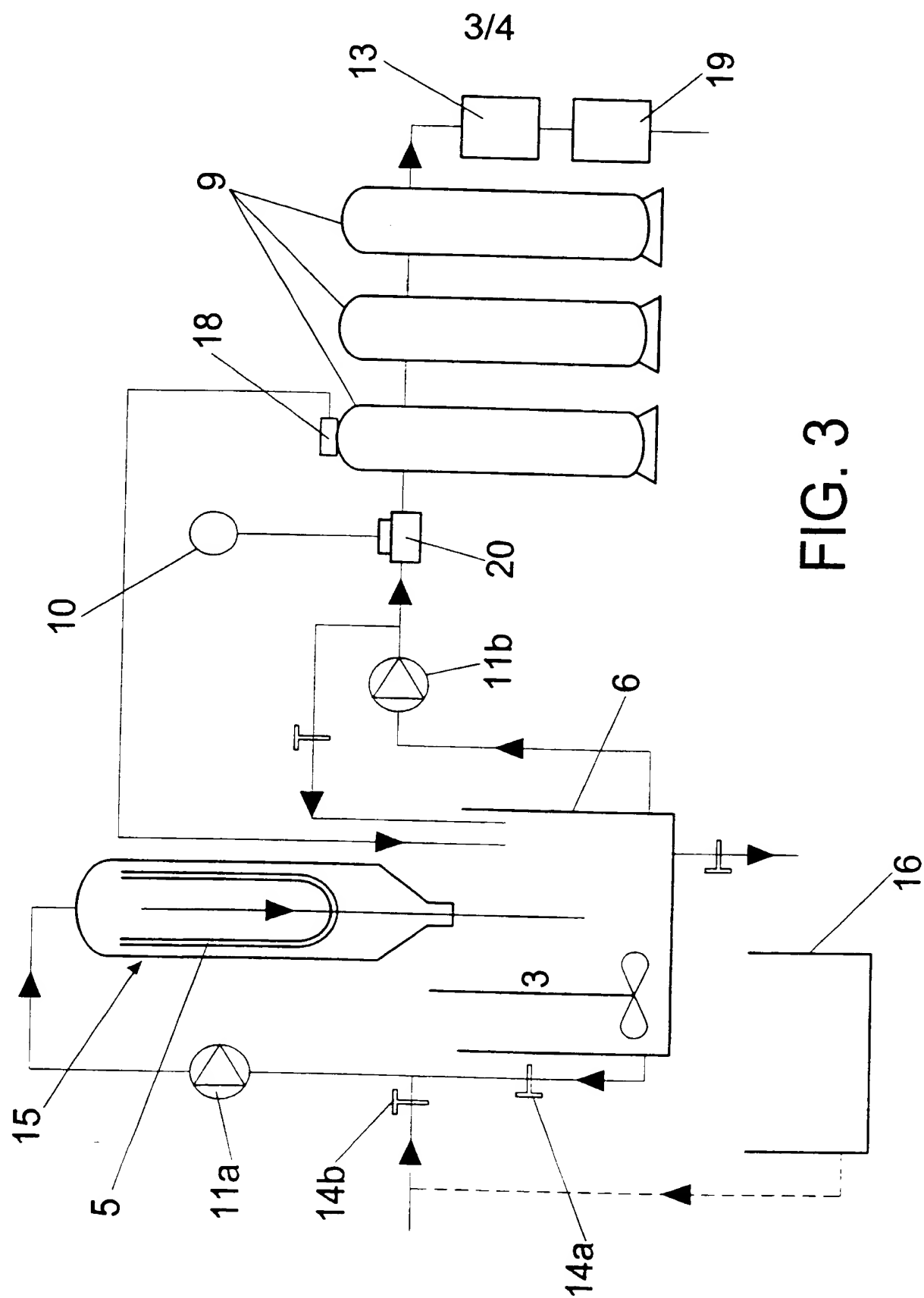
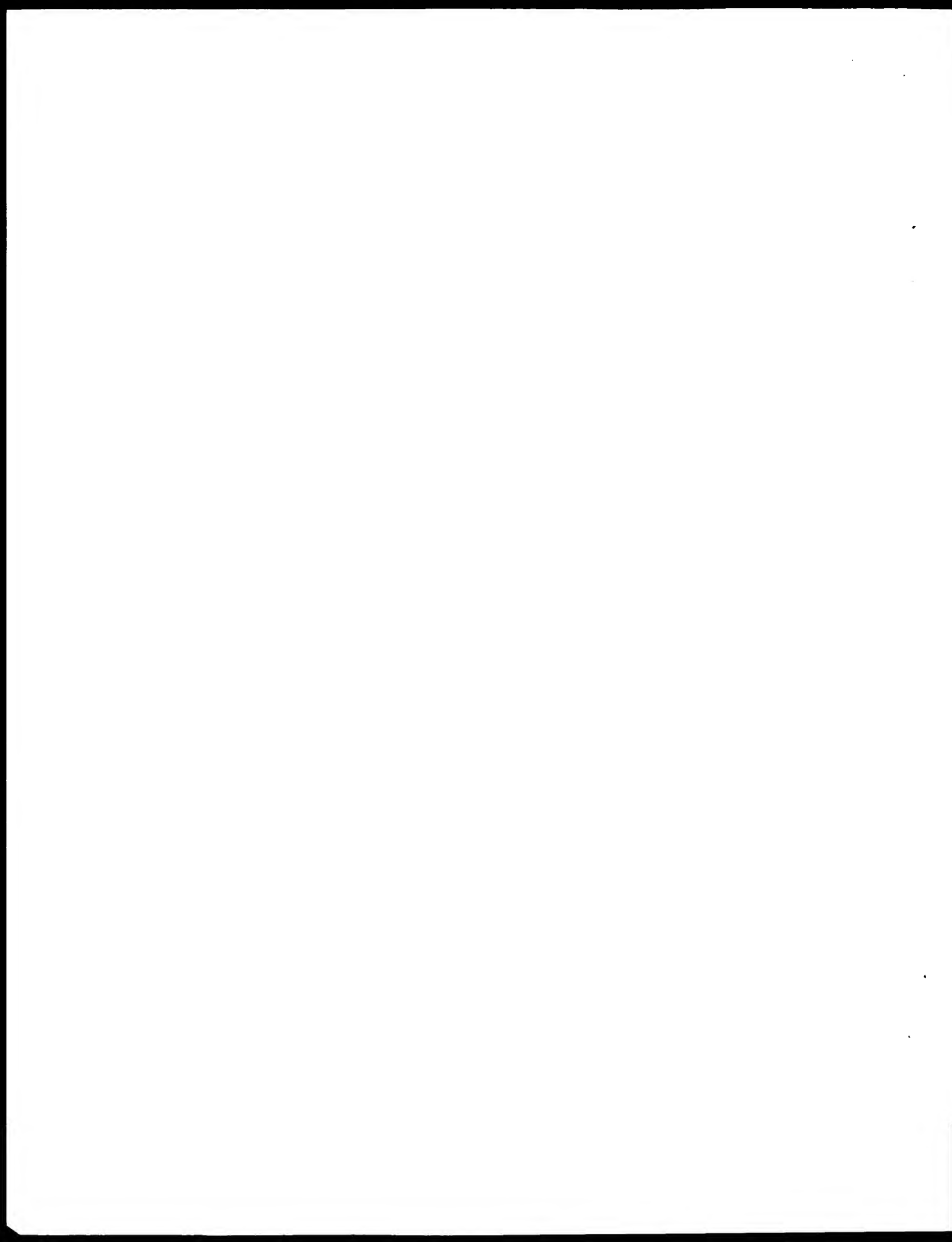


FIG. 3



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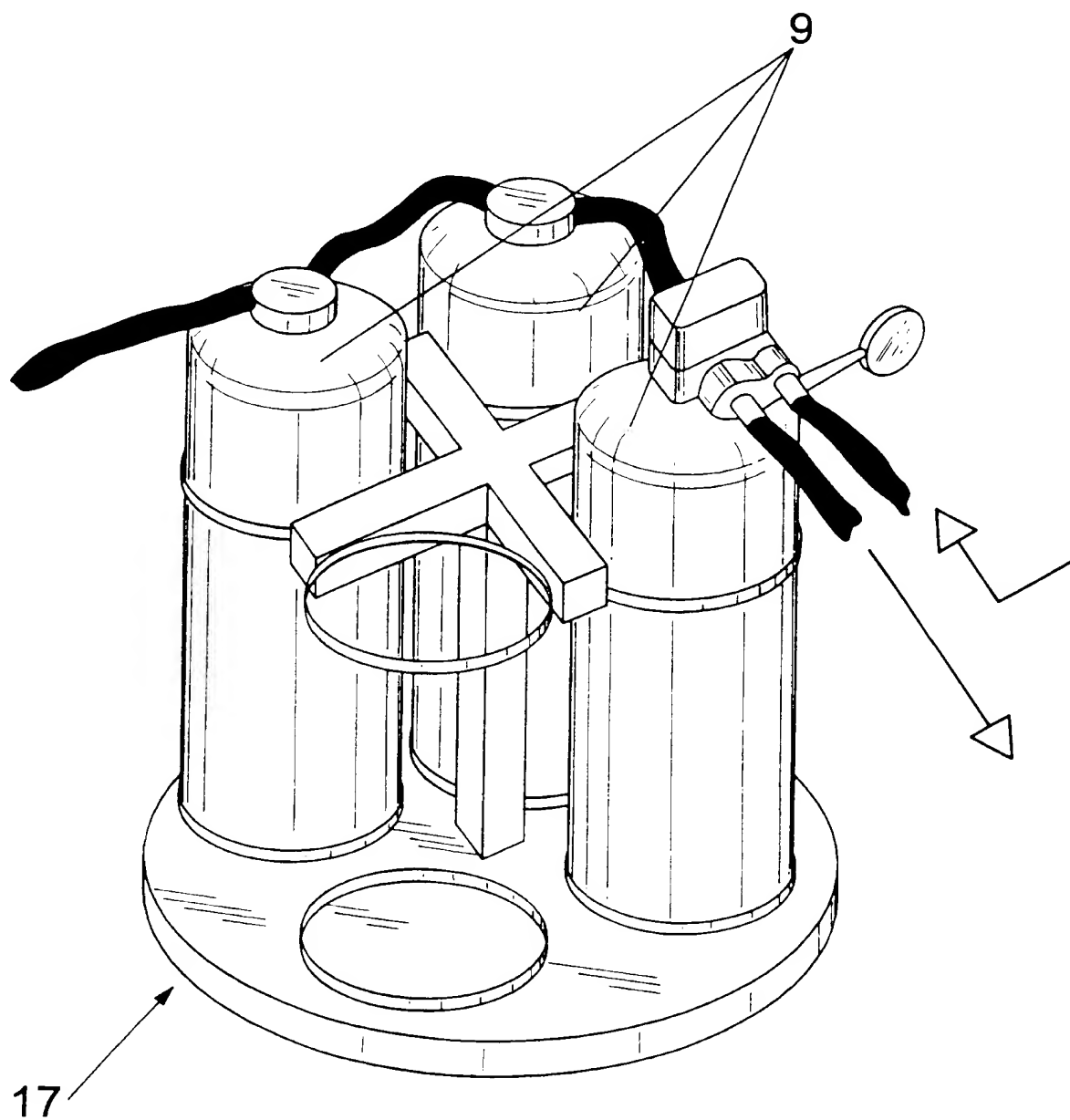
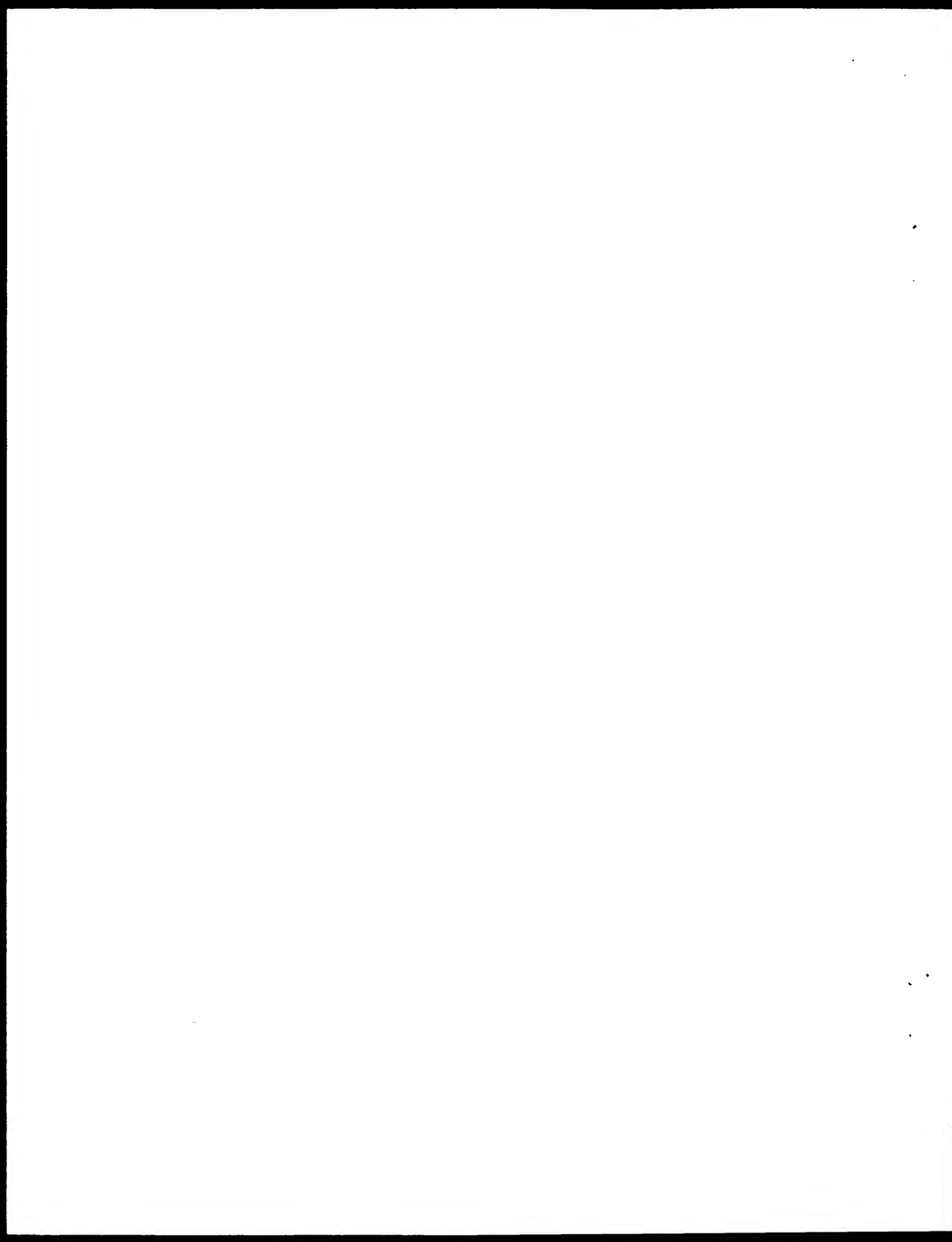


FIG. 4



INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES/00033

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C02F 9/08, B01D 36/04 // (C02F 9/08, 1:28, 1:32) C02F 103:32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C02F, B01d

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

OEPMPAT, EPODOC, WPI, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0176912 A (BAYER AG) 9 April 1986 (09.04.86) Claim 1, figure	1
Y		5
Y	ES 2027366 T3 (KNIGHT) 01 June 1992 (01.06.1992), Claims 1 and 2	5
A	EP 0607760 A2 (IACOMELLI) 27 April 1994 (27.04.1994), The whole document	2,3
A	US 5443733 A (MUELLER & SEKONLOW) 22 August 1995 (22.08.1995), abstract	5

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

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Date of the actual completion of the international search

04 April 2000 (04.04.2000)

Date of mailing of the international search report

18 April 2000 (18.04.2000)

Name and mailing address of the ISA/

S.P.T.O.

Authorized officer

Facsimile No.

Telephone No.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/ ES 00/00033

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0176912 A2	09.04.1986	DE 3436453 A JP 61090787 A DK 8504533 A US 4663047 A IL 76544 A EP 0176912 B DE 3574125 G	17.04.1986 08.05.1986 06.04.1986 05.05.1987 30.11.1988 08.11.1989 14.12.1989
ES 2027366 T3	01.06.1992	EP 0316687 A,B JP 1236985 A,B US 4971687 A DE 3866219 G IL 88297 A CA 1321954 C KR 9605718 B1	24.05.1989 21.09.1989 20.11.1990 19.12.1991 18.08.1993 07.09.1993 01.05.1996
EP 0607760 A2	27.04.1994	IT 1265830 B	12.12.1996
US 5443733 A	22.08.1995	DE 4302319 A1 EP 0571744 A1,B1 JP 6134448 A	25.11.1993 01.12.1993 17.05.1994

INFORME DE BÚSQUEDA INTERNACIONAL

Solicitud internacional n°
PCT/ ES 00/00033

A. CLASIFICACIÓN DEL OBJETO DE LA SOLICITUD

CIP⁷ C02F 9/08, B01D 36/04 // (C02F 9/08, 1.28, 1.32), C02F 103: 32
De acuerdo con la Clasificación Internacional de Patentes (CIP) o según la clasificación nacional y la CIP.

B. SECTORES COMPRENDIDOS POR LA BÚSQUEDA

Documentación mínima consultada (sistema de clasificación, seguido de los símbolos de clasificación)

CIP⁷ C02F, B01D

Otra documentación consultada, además de la documentación mínima, en la medida en que tales documentos formen parte de los sectores comprendidos por la búsqueda

Bases de datos electrónicas consultadas durante la búsqueda internacional (nombre de la base de datos y, si es posible, términos de búsqueda utilizados)

OEPMPAT, EPODOC, WPI, PAJ,

C. DOCUMENTOS CONSIDERADOS RELEVANTES

Categoría*	Documentos citados, con indicación, si procede, de las partes relevantes	Relevante para las reivindicaciones n°
X Y	EP 0176912 A (BAYER AG) 09.04.1986, reivindicación 1, figura	1 5
Y	ES 2027366 T3 (KNIGHT) 01.06.1992, reivindicaciones 1 y 2	5
A	EP 0607760 A2 (IACOMELLI) 27.04.1994, todo el documento	2,3
A	US 5443733 A (MUELLER & SEKONLOW) 22.08.1995, resumen	5

☐ En la continuación del recuadro C se relacionan otros documentos ☒ Los documentos de familia de patentes se indican en el anexo

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"&" documento que forma parte de la misma familia de patentes.

Fecha en que se ha concluido efectivamente la búsqueda internacional. 04 abril 2000 (04.04.2000)

Fecha de expedición del informe de búsqueda internacional

18 ABR 2000

18.04.00

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INFORME DE BÚSQUEDA INTERNACIONAL
Información relativa a miembros de familias de patentes

Solicitud internacional nº

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Documento de patente citado en el informe de búsqueda	Fecha de publicación	Miembro(s) de la familia de patentes	Fecha de publicación
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